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EXAMINER	
CHEN, WENPENG	
ART UNIT	**PAPER NUMBER**
2624	

DATE MAILED: 03/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/660,570	HEMINGWAY, PETER	
	Examiner	Art Unit	
	Wenpeng Chen	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) *4 and 5* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 6-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 September 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 09/527,860.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/12/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Drawings

1. Figures 1-2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Although the Applicant expressed to add --Prior Art-- to Figs. 1-2, the amendments were not reflected in the filed drawings.

Specification

2. The disclosure is objected to because of the following informalities.

-- Please amend the title to "METHOD OF COLOR INTERPOLATION" as that used in the parent case.

-- Examiner has checked the amendments to the specification and agreed with the changes in their contents. However, the way to specify the locations of some amended paragraphs causes confusion, error, or both. For example, the amendment calls for the last paragraph on page 2. Actually, the corresponding paragraph is the first paragraph on page 3.

Please provide a complete specification including all the amendments to avoid unnecessary confusion or error, especially if the application would reach the printing stage.

Appropriate correction is required.

3. The abstract should be in narrative form and generally limited to a single paragraph within the range of 50 to 150 words. The abstract should not exceed 25 lines of text.

The abstract exceeds 150 words.

Claim Objections

4. Claim 23 is objected to because of the following informalities:

-- In Claim 23, "wherein n is a equal to three" shall be changed to "wherein n is equal to three" or "wherein n is an integer equal to three". Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-3, 6-11, and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto et al. (US patent 4,275,413 cited in IDS) in view of Miyake (US patent 6,415,065.)

Sakamoto teaches a method of determining a value for a function, comprising:

-- establishing an n-dimensional lattice having a plurality of lattice points, the function having values at the lattice points, wherein n is a positive integer greater than or equal to two; (column 2, lines 14-32; column 4, lines 13-43; column 12, lines 15-34; column 9, line 50 to column 10, line 5; In the example, there are 256 x 256 x 256 lattice point. It has that n=3.)

- wherein n=3 and the n-simplex comprises a tetrahedron; (n=3 for RGB; Figs. 9-10)

-- recording values for a subset of the lattice points, the lattice points of the subset being known value lattice points; (Figs. 9-10; column 9, line 50 to column 10, line 24; Points A, B, C, and D are known value lattice points.)

- (a) wherein the known value lattice points form a sparse lattice with known value lattice points separated from each other by an integer multiple of the distance between adjacent lattice points, (b) wherein said integer multiple is an integer power of two, and (c) wherein the integer is 4 and all given lattice points coincide with a value lattice point or lie between two adjacent value lattice points or lie within a triangle described by three adjacent value lattice points; (column 12, lines 15-56; The integer multiple is 16 for the example.)

-- establishing a value for a given lattice point by *using* the values of only m of (n+l) known value lattice points defining an n simplex touching or enclosing the given lattice point, wherein m is a positive integer equal to the number of n-simplexes of none-zero volume whose vertices consist of the given lattice point and n of the (n+1) known value lattice points, and by

returning a weighted average of the m of the known value lattice points; (column 9, line 50 to column 10, line 24; The value U(P) is interpolated from 4 points for the 3-dimensional lattice. *The cited passage, for example, teaches that "a weighted average of three of the four known value lattice point values is used if the given lattice point is on a face of the tetrahedron bounded by the three of the four known value lattice points but is not touched by an edge of the tetrahedron" as explained below. In this case, m=3, (n+1) =4, and there are m (=3) 3-simplexes of none-zero volume. Only values associated with none-zero volume are used. For example, when z_f=0, the point is at a face, U(O) is not used in Eq. III because it is multiplied by zero.*)

- wherein a weighted average of all four known value lattice point values is used if the given lattice point is enclosed by the tetrahedron but is not touched by a face of the tetrahedron, a weighted average of three of the four known value lattice point values is used if the given lattice point is on a face of the tetrahedron bounded by the three of the four known value lattice points but is not touched by an edge of the tetrahedron, a weighted average of two of the four known value lattice point values is used if the given lattice point is on an edge of the tetrahedron bounded by the two of the four known value lattice points but is not at a vertex of the tetrahedron, and wherein a value of one of the known value lattice points is used if the given lattice point is also the known value lattice point; (column 9, lines 1-33; column 10, lines 6-24; As shown in column 2, lines 43-46, x_f, y_f, and z_f, are the decimal parts. When z_f= 0, the P point lies a surface defined by $z=z_i$, the equation at column 10 shows that only points A, B, and C are used. When z_f= 0 and y_f= 0, the P point lies on a line defined by $z=z_i$ and $y=y_i$, the equation at column 10 shows that only points A and B are used. When z_f= 0, y_f= 0 and x_f= 0, the P point is

at the point defined by $z=z_i$, $y=y_i$ and $x=x_i$, the equation at column 10 shows that only point A is used.)

-- (a) wherein if the given lattice point is enclosed by the tetrahedron but is not touched by a face of the tetrahedron, and the tetrahedron has vertices of known value lattice points with positions A, B, C, D and values a, b, c, d at the respective vertices, and wherein the given lattice point has position P and wherein the volume between four positions is expressed as Vol (position 1 position 2 position 3 position 4) the value p returned is given by: p = (Vol(A-BCP) . d + Vol(ABDP) c + Vol(ACDP) b + Vol(BCDP). a) / Vol(ABCD), (b) wherein if the given lattice point is on a face of the tetrahedron bounded by the three of the four known value lattice points but is not touched by an edge of the tetrahedron, the three of the four known value lattice points being A, B and C with values a, b and c respectively, the value p returned is given by p = ((Area(BCP) . a) + (Area(ACP) . b) + (Area(AEP) . c)/Area(ABC), and (c) wherein if the given lattice point is on an edge of the tetrahedron bounded by the two of the four known value lattice points but is not at a vertex of the tetrahedron, the two of the four known lattice points being A and B with values a and b, the value p returned is given by p = ((Distance (AP) . b) + (Distance (BP) . a))/Distance(AB); (column 9, lines 1-33; column 10, lines 6-24; The passage in column 9, lines 1-33 clearly shows the interpolation is based on volumes. When the interpolation based on those recited in Claims 6-8 of the present application are carried out, they result the same equation given in column 10, lines 6-24 of Sakamoto patent. Therefore, Sakamoto inherently teaches the features.)

-- wherein the step of establishing a value comprises determining a set of four known value lattice points which form a tetrahedron touching or enclosing the given lattice point, and

providing the weighted average from the positions of four known value lattice points, the known values of one or more of the four known value lattice points, and the position of the given lattice point; (column 9, line 50 to column 10, line 24; column 12, line 15 to column 13, line 55)

- wherein the step of providing the weighted average comprises using the positions as inputs to a jump table. (column 10, line 19-24 and Table 2; The weights as shown in Table 2 depend on the position of the point P. *The Examiner considers that the cited Table 2 is a jump table because Table 2 uses the results of discrimination conditions listed in column 1 to determine the factors to be used for interpolation of a given lattice in one of possible tetrahedrons. The result given column 1 provides a pointer for an assigned equation associated with the factors. Therefore, it meets the broad definition of a jump table.*)

However, Sakamoto does not teach explicitly "***determining*** the values of only m of (n+l) known value lattice points defining an n simplex touching or enclosing the given lattice point." As cited above, Sakamoto teaches using the values of only m of (n+l) known value lattice points but not explicitly teaches that only m values of (n+l) known value lattice points are determined during the process.

Miyake teaches a method of determining a value for a function, comprising:

-- ***determining*** the values of only m of (n+l) known value lattice points defining an n simplex touching or enclosing the given lattice point for tetrahedron interpolation; (column 12, line 43 to column 13, line 31; For example, the method teaches the feature of determining and selecting 4, 3, and 2 vertices when a to-be-interpolated point is inside the tetrahedron, on a face of the tetrahedron, and on a line of the tetrahedron, respectively.)

It is desirable to speed up color transformation. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to apply Miyake's teaching to modify Sakamoto's interpolation process for not determining those values associated with known value lattice points that are not used in Sakamoto's interpolation process, because this speeds up the interpolation computation. The combination thus teaches "establishing a value for a given lattice point by determining the values of only m of (n+l) known value lattice points defining an n simplex touching or enclosing the given lattice point, wherein m is a positive integer equal to the number of n-simplexes of none-zero volume whose vertices consist of the given lattice point and n of the (n+1) known value lattice points, and by returning a weighted average of the m of the known value lattice points."

The above-cited method is applied for mapping values in a first color space to values in a second color space. (column 2, lines 3-13) Therefore, the combination also teaches Claim 16.

Sakamoto further teaches an apparatus to implement the above-cited method. The apparatus performs many computation steps and therefore is a computer. Because Claims 17-19 are the corresponding apparatus claims of the method Claims 1, 2, and 3, respectively, the combination also teaches Claims 17-19.

7. Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Sakamoto and Miyake as applied to Claims 1-3, and further in view of Schoolcraft et al. (US patent 6,466,333 cited in IDS.)

Claims 20-22 are the corresponding medium claims of the method Claims 1-3, respectively. As discussed above, the combination of Sakamoto and Miyake teaches all the steps

recited in Claims 20-22. However, the combination does not explicitly teach the medium recited in Claims 20-22.

Schoolcraft teaches a computer program product comprising a computer readable medium and a computer program. (Column 4, lines 12-16 and 40-49)

It is desirable to make a processing method portable from a computer to another computer. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to store the processing steps of the method taught by the combination of Sakamoto and Miyake in a computer readable medium taught by Schoolcraft, because the overall combination makes the processing method portable and therefore increase its application.

8. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Sakamoto and Miyake as applied to Claim 10, and further in view of Yip et al. (US patent 6,289,138 cited in IDS.)

The combination of Sakamoto and Miyake teaches the parental Claim 10. However, the combination does not teach the feature associated with the limitation that the integer is 8 or more.

Yip teaches a color interpolation process wherein in 12 bits are assigned to each color component. The 12 bits are divided into 4 bit in an interval table and 8 bits for fractional table. (column 50, lines 38-53)

It is desirable to be able to perform color mapping for high-resolution color having 12 bits for each color component as well as regular resolution color having 8 bits because it broadens the application of the color mapping process. It would have been obvious to one of

ordinary skill in the art, at the time of the invention, to combine the teachings of the combination of Sakamoto and Miyake and Yip to interpolate Yip's color data of 12-bit format, because the overall combination broadens the application of the color mapping method. The overall combination teaches that wherein the integer is 8 and all given lattice points coincide with a value lattice point or lie between two adjacent value lattice points or lie within a triangle described by three adjacent value lattice points or lie within or lie within a tetrahedron of four adjacent value lattice points.

Double Patenting

9. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

10. Claim 23 is rejected under 35 U.S.C. 101 as claiming the same invention as that of claim 1 of prior U.S. Patent No. 6,697,520. This is a double patenting rejection.

Examiner's comment

11. Claim 23 is not rejectable over the prior art.

The following is a statement of reasons for the conclusion. The prior art fails to teach the method of Claim 5 which specifically comprises the following feature in combination with other recited limitation:

-- wherein ***a given lattice point close to an edge or a face of the tetrahedron is changed to a point lying on the edge or the face of the tetrahedron*** before calculation of the weighted average.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wenpeng Chen whose telephone number is 703 306-2796 before 3/30/2005 and 571-272-7431 after 3/30/2005. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K Moore can be reached on 703 308-7452 before 3/30/2005 and 571-272-7437 after 3/30/2005. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9306 for After Final communications. TC 2600's customer service number is 703-306-0377.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 305-4700.

Wenpeng Chen
Primary Examiner
Art Unit 2624

March 22, 2005